

KEYS TO THE FLORA OF FLORIDA - 16
XYRIS (XYRIDACEAE)

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ABSTRACT

Xyris (Xyridaceae) is represented in Florida by 19 species, two of which (*X. isoetifolia*, *X. longisepala*) are endemic to the state. Seven of the species are considered rare within Florida. Three species (*X. chapmanii*, *X. isoetifolia*, *X. longisepala*) are rated as endangered, and one (*X. scabrifolia*) as threatened. *Xyris difformis* is believed to consist of 3 varieties, and *Xyris elliottii* of 2 varieties. The nomenclatural basis for *Xyris caroliniana* is discussed. An amplified key is given to the Florida taxa.

KEY WORDS: *Xyris*, Xyridaceae, Florida flora.

Few genera in the southeastern United States are as readily identified as *Xyris*, the Yellow-eyed-grasses. Their narrow wholly-basal leaves, the solitary, compact, ellipsoid heads atop a slender scape, and the 3-petaled yellow (or white) flowers, mark this genus as no other.

Yet identification to species is vastly more difficult. The very uniformity of form that so well distinguishes this genus simultaneously blends the text-book description of one species or variety into that of another. Identification is further impeded by the few morphological characters possessed by these plants and the necessity for systematists to invoke critical but often subtle distinctions for separation of the taxa.

Two authors have been outstanding for their skill in recognizing the sometimes obscure features that define *Xyris* species. Alvan Wentworth Chapman, physician and astute botanist of Apalachicola, Franklin County, in the sequential editions of his Flora of

the Southern United States (1860, 1889, 1897), identified 7 new species of *Xyris* in panhandle Florida. Robert Kral, beginning with the summer of 1958 devoted to collection of Florida plants (sponsored by George Cooley), has gained a mastery of the genus that has enabled him to prepare and publish a series of detailed treatments (Rhodora 62:295-319. 1960; Sida 2:177-260. 1966; Novon 9:205-219. 1999; Flora N. Amer. 22:154-167. 2000), including a further 5 new taxa.

Though the genus *Xyris* contains 200-400 species worldwide (D. J. Mabberley. 1997), no foreign species appears to have become established in Florida; all Florida species of *Xyris* are native. *Xyris jupicai* is the most abundant, aggressive member of the genus in the state, characteristics that suggest it may have been recently introduced. But Chapman knew it (as *X. elata*) in 1860, and A. Michaux used "*jupicai*" on a label, about 1790.

Nomenclature for most Florida species of *Xyris* is straightforward, with the type known (and in nearly all cases examined by Kral). Only one name has generated uncertainty and dispute.

In the late 18th century the South Carolina rice planter and amateur botanist Thomas Walter published his landmark Flora Caroliniana (1788). Though 10 species of *Xyris* are now known in coastal South Carolina (Radford et al., Manual of the Vascular Flora of the Carolinas. 1968), Walter recognized only one, his *Xyris caroliniana*. Walter kept no type, nor is there a specimen of the genus in the herbarium in London (BM) of Carolina plants prepared by his friend John Fraser. H. L. Blomquist (J. Elisha Mitchell Sci. Soc. 71:35-46. 1955) considered *X. caroliniana* to be ambiguous, and for many years the name was largely disregarded.

In search for a specimen that could be interpreted as the type of Walter's *Xyris caroliniana*, Kral (Sida 2:236-237. 1966) located a Fraser specimen in the Lamarck herbarium, Paris (P) that he identified as *X. flexuosa*. This inconspicuous dry-soil species surely isn't what Walter (1788) knew in the rice fields of his Santee River plantation, nor do its linear twisted leaves correspond to Walter's "fol. *gladiatis*." In a recent search (D.B.W., July 1990), *X. flexuosa* could not be found anywhere in the vicinity of Walter's homesite. Moreover, though

Fraser visited Walter at his Santee plantation and provided him with materials for some of the plants described in his Flora, the great bulk of Fraser's collections was made quite independently of Walter (Ward, Taxon 26:227-234. 1977; Sida, in press), and there is no sufficient reason for connecting the specimen of Fraser with the description by Walter. Kral's selection is thus effectively a neotype, from another location and by a different collector.

But the inadequacy of Fraser's specimen as a type for *Xyris caroliniana* does not readily lead to an incontrovertible alternative. *Xyris flexuosa* Muhl. (1813) is unidentifiable and nude. *Xyris flexuosa* Muhl. ex Ell. (1816) is well described but is superfluous since *X. caroliniana* is cited in synonymy. *Xyris flexuosa* Muhl. ex Cham. (1860) similarly fails, with *X. bulbosa* Kunth (= *X. torta* J. E. Sm.) in synonymy. Since these names, from their accompanying descriptions, refer to the dry-soil species, it is disappointing that they are unavailable. For the present, unsatisfying as it may be, there seems no alternative clearly better than the neotypification proposed by Kral.

The following "amplified key"¹ is largely based on the documentation and conclusions in the publications of Robert Kral, and the verbal and written supplements he has generously given me over the years. The structure and phraseology, however, are often of my own design, permitting the reader access to an independent view and a somewhat different terminology that may assist in the identification of this unique group of Florida plants.

XYRIS L. Yellow-eyed-grasses

1. Sheath of the scape, with its leaflike terminal extension, equalling or exceeding the longest leaves; plants diminutive (leaves usually <5 cm. long, rarely to 10 cm.); scapes filiform.

2. Base of leaf abruptly lustrous chestnut-brown; sheath of the scape about equalling the longer foliage leaves; yellow-flowered. Perennial herb. Moist acid sands and sandy peats of seepage bogs and ditches. Western panhandle (e. to Liberty County); rare. Summer-fall. *Xyris drummondii* Malme

2. Base of leaf not differently colored; sheath clearly exceeding the longer foliage leaves.

3. Bracts of the spike with the outer border maroon and the edge lacerate; leaves ascending, usually narrowly linear, the apical portion usually green; plants usually in clumps with many scapes; yellow-flowered. Perennial herb. Moist acid sands of pond margins, low pinelands, clearings, and disturbed areas. South peninsula (Collier County), north to mid-panhandle (Gulf, Liberty counties); common, at times so abundant as to form a thin turf. Winter-spring. *Xyris brevifolia* Michx.

3. Bracts of the spike with outer border not differently colored, the edge entire or minutely erose; leaves flabellately spreading, often maroon; plants usually with solitary or few scapes; yellow-flowered. Perennial herb. Moist acid sands of pond margins and clearings in pine flatwoods. Nearly throughout; infrequent (rare in south peninsula and western panhandle). Spring. *Xyris flabelliformis* Chapm.

1. Sheath of the scape surpassed by the longest leaves; plants delicate to robust but of appreciable size (the leaves >8 cm. in length, often very much so); scapes stout or slender, but not filiform (except *X. isoetifolia*, with linear-filiform scapes and leaves as short as 4 cm.).

4. Keel of the lateral sepals prominently fimbriate, the longer strands of tissue threadlike and definitely exceeding the width of the keel (although perhaps not the width of the entire sepal); tips of lateral sepals exerted beyond the subtending bract; spikes usually >1.0 cm. long.

5. Bases of leaves hard, lustrous chestnut-brown; ridges on scape inconspicuous, smooth to the touch; spikes narrowly ellipsoidal or lance-ovoid, somewhat lustrous; plant wiry, to 1 m. tall, with narrow, spirally twisted leaves and a bulbous base deeply buried in the substrate; yellow- or white-flowered (almost exclusively white in s. pen.), usually opening in the afternoon. Perennial herb. Moist to dry acid sands of pond embankments, pine flatwoods, and savannas. Nearly throughout (excl. Keys); common. Summer-fall.

[*Xyris flexuosa* Muhl.; *Xyris pallescens* (Mohr) Small, the white-flowered form; *Xyris torta*, misapplied] Twisted yellow-eyed-grass
Xyris caroliniana Walt.

5. Bases of leaves soft, straw-colored to pale green or pinkish; ridges on scape prominent, harsh to the touch; spikes ovoid or broadly ellipsoidal, dull brown; plant robust, to 1.5 m. tall; yellow-flowered, opening in the morning. Perennial herb. Ditches, wet pinelands, shallow ponds, usually with the base of the plant submersed. North Florida, south to mid-peninsula (Lake Okeechobee); infrequent. Summer-fall. *Xyris fimbriata* Ell.

4. Keel of the lateral sepals variously ciliate to lacerate or entire, the longer strands of tissue either shorter than the width of the keel or, if longer, ragged and not forming fimbriate threads; tips of the lateral sepals exerted or not.

6. Tips of at least some of the lateral sepals slightly to conspicuously exerted beyond the subtending bract.

7. Leaves 5-15 mm. broad; plant robust, the scapes to 1.5 m. tall; seeds >0.7 mm. long; yellow-flowered. Perennial herb. Shallow standing water of cypress ponds, lake shores, wet prairies, and ditches, with the base of plant submersed. Nearly throughout (excl. Keys); infrequent. All year. If lateral sepals are not observed as exerted, this may be mistaken for *X. jupicai* from which it is separated by its larger size and usually pinkish basal coloration. *Xyris smalliana* Nash

7. Leaves 1-2 mm. broad; plant slender, almost delicate, yet tall, the scapes to 0.8 m. in height; seeds <0.3 mm. long; yellow-flowered. Short-lived perennial herb, or annual. Exposed sandy shores of fluctuating karst-pond lakes. West and central panhandle (e. to Leon County); rare. Summer. Endemic. ENDANGERED (State listing). *Xyris longisepala* R. Kral

6. Tips of lateral sepals not exerted beyond the subtending bract (only appearing exerted if detached, as in old or dried spikes).

8. Leaves narrowly linear to filiform (<2 mm. wide); base of leaves hard, dark brown, often lustrous; spikes <1 cm. long (occasionally somewhat more in *X. elliotii*); plants growing in large tufts with many scapes.

9. Keel of lateral sepals with irregular, jagged or torn edge; leaves narrowly linear to filiform, 10-30 cm. long; spikes with numerous, tightly imbricated bracts; staminodia bearded or not; seeds various.

10. Staminodia bearded (and visible as a tangle of yellow threads in the open flower); seeds 0.5-0.6 mm. long; yellow-flowered. Perennial herb. Sandy soils of roadside ditches, pond margins. Spring-summer. *Xyris elliotii* Chapm.

a. Leaves narrowly linear (1-2 mm. wide), pale to near-white on edges. Throughout; common to abundant.

var. *elliotii*

a. Leaves filiform (<1 mm. wide), lacking or with inconspicuously paler edges. Throughout; frequent to common (less frequent overall than var. *elliotii*, but locally predominant in central peninsula and western panhandle).
var. *stenotera* Malme

10. Staminodia beardless (without tangle of yellow threads in the open flower); seeds 0.8-1 mm. long; leaves filiform (<0.5 mm. wide); yellow-flowered. Perennial herb. Moist sands of pine flatwoods and roadside ditches. Panhandle and north Florida (s. to Levy, Marion counties); infrequent. Spring. *Xyris baldwiniana* Schult. in Roem. & Schult.

9. Keel of lateral sepals with regularly spaced, short, cilia-like teeth; leaves filiform (<0.5 mm. wide), relatively short (4-15 cm. long); spikes with few, loosely imbricated bracts; staminodia bearded (with a tangle of yellow threads in the open flower); seeds <0.5 mm. long; yellow-flowered. Perennial herb. Moist sands or sandy peats of savanna bogs, flatwood pond margins, lake shores. Central panhandle (Bay,

Gulf, Washington counties); very local and rare. Spring-summer. Endemic. ENDANGERED (State listing).

Xyris isoetifolia R. Kral

8. Leaves linear but not narrowly so (>2 mm. wide); base of leaves soft (fibrous in *X. ambigua*), pink, pinkish-purple, straw-colored, greenish, or brown to blackish (but not lustrous); spikes >1 cm. long (frequently less in *X. jupicai* and *X. difformis*); plants with solitary or few scapes (or in large clumps in *X. stricta* and *X. serotina*).

11. Keel of lateral sepals with regularly spaced, short, cilia-like teeth; old leaf bases persisting as blackened or brown shreds; plants robust, at times forming large clumps.

12. Edge of leaves strongly papillate, the individual protrusions usually several times as long as wide; leaves usually spreading, less than one-half the height of the scape, drying to uniform brown or tan, the inner leaf bases without dark veins; petals 8-10 mm. long, yellow, the flowers opening in the early morning; seeds translucent. Perennial herb. Moist sandy or peaty soils of pine flatwoods, savannas, roadside ditches. Panhandle and peninsula (s. to Collier, Palm Beach counties); frequent to common. Summer-fall. *Xyris ambigua* Beyr. ex Kunth

12. Edge of leaves mildly papillate or merely roughened, the protrusions low and rounded; leaves usually erect and more than one-half the height of the scape, drying to dark pinkish-brown, the inner leaf bases with dark veins against a pale surface; petals 4-5 mm. long, yellow, the flowers opening in late morning; seeds opaque, yellow. Perennial herb. Summer-fall. *Xyris stricta* Chapm.

a. Leaves 3-8 mm. broad, clearly papillate. Very wet sandy or peaty soils of cypress-gum swamps and low flatwoods, the plant base often submersed. Central panhandle, disjunct to upper east coast (Flagler, Volusia counties); infrequent. var. *stricta*

a. Leaves 2.5-3 mm. broad, smooth to slightly papillate. Moist sandy peats or clays, never immersed. West panhandle (e. to Liberty County); rare. [*Xyris louisianica* Bridges & Orzell] var. *obscura* R. Kral

11. Keel of lateral sepals with irregular, jagged or torn edge; old leaf bases soft and not persisting; plants robust to small and slender.

13. Leaves and scapes markedly spirally twisted above, pink or purplish (infrequently ivory) toward base.

14. Plants slender (leaves 2-4 mm. wide); lowest portion of leaf not conspicuously thickened; base of plant deeply buried but not bulbous; leaves smooth, the outermost not appreciably shorter than others; flowers opening in the late morning; petals ca. 3 mm. long, yellow. Perennial herb. Deep muck of acid bogs. Western panhandle (Munson, Santa Rosa County); very rare. ENDANGERED (State listing).

Xyris chapmanii Bridges & Orzell

14. Plants robust (leaves 5-10 mm. wide); lowest 1-2 cm. of each leaf thickened and fleshy, forming a bulb-like enlargement at base of plant (more conspicuous when fresh); usually a few outermost leaves very short (1 to 2 times as long as wide), spoon-like around the swollen base; flowers opening in the afternoon; petals ca. 5 mm. long.

15. Leaf and scape surfaces smooth; plants tall (the scape to 1 m.); flowers usually white, sometimes yellow, the petals obovate; seeds <0.6 mm. long. Perennial herb. Wet acid sands, pine flatwoods, grassy savannas, pond margins, ditch banks, quickly occupying cleared and disturbed soils. Panhandle, south to mid-peninsula (Lee, Martin counties); common. Summer-fall. *Xyris platylepis* Chapm.

15. Leaf and scape surfaces prominently papillose or tuberculate-scabrid, the foliage appearing glazed or glassy; plants medium (the scape seldom above 0.5 m.); flowers yellow, the petals suborbicular; seeds 0.6-1 mm. long. Perennial herb. Moist to wet sandy peats of acid bogs or seepage slopes. West and central panhandle (Escambia, Washington, Calhoun, Bay counties); rare. Summer-fall. Endemic. Threatened (State listing). *Xyris scabrifolia* Harper

13. Leaves and scapes not markedly spirally twisted, tan or pinkish toward base.

16. Scape flattened and 2-edged, in cross section narrowly elliptic, the edges smooth; spike usually >2 cm. long; plants robust (leaves 10-25 mm. wide); base of plant pink to purplish; yellow-flowered. Perennial herb. Emergent from shallow water at edge of streams or flatwood ponds, usually on clayey soils. Western panhandle (e. to Jefferson County), disjunct to northeast Florida (St. Marys River, Nassau County); rare. Summer-fall. [*Xyris iridifolia* Chapm.]

Xyris laxifolia Mart. var. *iridifolia* (Chapm.) R. Kral

16. Scape terete, with 2-several ridges sharply distinct from the scape-body, the edges papillate-scabrid or smooth; spikes usually <1.5 cm. long; plants medium to small (leaves <15 mm. wide).

17. Plant base pink to purplish (sometimes faded in dried material; not to be confused with pigment-congested cells of upper leaves and scape), if pigment absent, ridges on scape broad (each of larger ridges half or more the width of the scape-body); yellow-flowered. Perennial herb. Seepage bogs, acid pond margins, wet ditchbanks, and along streams in bottomland woods. Summer-fall. *Xyris difformis* Chapm.

a. Surface of leaves smooth; scape ridges usually 2, infrequently 3, the edges papillate-scabrid to nearly smooth. Western panhandle (e. to Jefferson County); infrequent. var. *difformis*

a. Surface of leaves, particularly the outermost, papillose or tuberculate-scabrid; scape ridges usually >3, the edges papillate-scabrid.

b. Plants usually over 20 cm. tall, the leaves 10-30 cm. long; seeds opaque, farinose. Peninsula (s. to Lake Okeechobee); frequent. var. *floridana* R. Kral

b. Plants usually under 20 cm. tall, the leaves less than 10 cm. long; seeds translucent, non-farinose. North and mid-Florida (Duval, Charlotte, Dade counties); rare. [*Xyris neglecta* Small]
var. *curtissii* (Malme) R. Kral

17. Plant bases green to straw-colored or blackish, without pink coloration; ridges of the scape narrow (much less than half the width of the scape-body).

18. Scape with 2 ridges (shortly below the spike), the edges smooth or very nearly so; plants pale green or straw-colored toward the base; yellow-flowered. Annual or short-lived perennial herb. Wet sand of ditches, clearings, prairies, pond margins, and lakeshores, often in disturbed areas. Throughout; common, sometimes locally abundant. Summer-fall-winter. [*Xyris communis* Kunth; *Xyris elata* Chapm.]
Xyris jupicai L. Rich.

18. Scape with 2 primary and 2-several secondary ridges, the edges clearly scabrous; plants dark brown or blackish toward the base; yellow-flowered. Perennial herb, usually in large clumps with many scapes. Wet sandy peat at edge of cypress ponds or flatwoods depressions. Western panhandle (e. to

Apalachicola drainage), disjunct in eastern peninsula (Volusia, Indian River counties); rare. Summer-fall.

Xyris serotina Chapm.

¹The "amplified key" format employed here is designed to present in compact form the basic morphological framework of a conventional dichotomous key, as well as data on habitat, range, and frequency. This paper is a continuation of a series begun in the 1970's (Phytologia 35: 404-413. 1977). Keys are being prepared for all genera of the Florida vascular flora, but the present "amplified" series is restricted to genera where a new combination is required or a special situation merits extended discussion.